REMARKS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-31 are pending in the present application. Claims 1, 12, 23, 24, 30, and 31 are amended by the present amendment.

In the outstanding Office Action, Claims 23-28, 30, and 31 were rejected under 35 U.S.C. § 102(b) as anticipated by Kasai (U.S. Patent No. 6,246,705); Claims 1-5 and 7 were rejected under 35 U.S.C. § 102(b) as anticipated by Ema et al. (U.S. Patent No, 5,946,334, herein "Ema"); Claims 1, 2, 16, and 18 were rejected under 35 U.S.C. § 102(b) as anticipated by Hironari (Japanese Patent Application JPH 11-105336); Claims 1-4, 6, 9, 15-17, 20 and 21 were rejected under 35 U.S.C. § 102(b) as anticipated by Thompson (U.S. Patent No. 5,444,728); Claim 29 was rejected under 35 U.S.C. § 103(a) as unpatentable over Kasai and Kaminishi (U.S. Patent No. 6,618,406); Claims 8 and 22 were rejected under 35 U.S.C. § 103(a) as unpatentable over Thompson in view of Kaminishi; Claims 10 and 11 were rejected under 35 U.S.C. § 103(a) as unpatentable over Thompson in view of Trotter et al. (A CMOS Low Voltage High Performance Interface, Phototyping Lab., Mississippi State Univ., MS, USA, ASIC Conference and Exhibit, 1994, herein "Trotter"); and Claim 19 was rejected under 35 U.S.C. § 103(a) as unpatentable over Thompson in view of Canright (Practical Design for Control Impedance, Orlando, Florida, USA, Electronic Components and Technology Conference, 1991, Proceedings 41st, 11-16 May 1991, pps. 370-377, Atlanta, GA).

The outstanding Office Action indicates in the Response to Arguments Section on pages 2 and 3, that the claimed "spatially separated block" feature is interpreted by the outstanding Office Action to mean that groups of circuit components are not occupying the same space. Although Applicants disagree with this interpretation of the outstanding Office

Action, as taken out of the context of the specification, in order to expedite the prosecution, independent Claims 1, 23, and 30 are amended to more clearly recite that first and second substrates are spatially separated and distinct from each other, as shown for example in Figure 2 and as disclosed in the specification at page 19, lines 8-14.

Thus, based on the above discussed amendments, the outstanding rejections on the merits of the claims are respectfully traversed for the following reasons.

Briefly recapitulating, amended Claim 23 is directed to a laser modulating and driving device that includes, *inter alia*, a pixel data generating unit configured to produce pixel data and formed on a first substrate, a modulation signal generating unit configured to generate a low-voltage modulation signal consisting of a pair of small swing differential signals, from the pixel data and formed in the first substrate, and a driving unit configured to drive a laser according to a laser modulation signal supplied from the modulation signal generating unit and formed in a second substrate, spatially separated and distinct from the first substrate. Independent Claim 30 has been amended similar to independent Claim 23.

In a non-limiting example, Figure 2 shows the pixel data generating unit 110 and the modulation signal generating unit 120 formed on the first substrate 10 and the driving unit 170 formed on the second substrate 20, which is spatially separate and distinct from the first substrate.

Turning to the applied art, Kasai shows in Figures 2 and 3 an optical scanning device having a control circuit 21 asserted by the outstanding Office Action to correspond to the claimed pixel data generating unit, a PWM data outputting circuit 23 asserted by the outstanding Office Action to correspond to the claimed modulation signal generating unit, both of which are formed on a controller 20, and a drive circuit 11 asserted by the outstanding Office Action to correspond to the claimed driving unit, and formed on a driver unit 10.

In the previously filed amendment, Applicants noted that the PWM data outputting circuit 23 of Kasai does not correspond to the claimed modulation signal generating unit because Kasai clearly shows in Figure 3 that the PWM data outputting circuit 23 outputs PMW data and the PMPW signal outputting circuit 13 actually generates the PMW signal. The outstanding Office Action indicated on page 2, second to last full paragraph, that element 23 "is believed to read on the claims as it is a modulation unit that generates output signals."

However, contrary to this interpretation of the data outputting circuit 23, Applicants respectfully submit that Kasai clearly distinguishes between the **data** outputting circuit 23 and the **signal** outputting circuit 13, by labeling these two circuits differently in Figure 3 and by specifically indicating at column 5, lines 6-15, that the modulation data outputting circuit 23 "outputs modulation **data**, as digital data" (emphasis added) and at column 5, lines 39-43, that the signal outputting circuit 13 "receive the PWM **data** which is output by the PWM data outputting circuit **23**, . . . and outputs a PWM **signal** to drive circuit **11**" (emphasis added).

In other words, the laser modulation signal is outputted by the signal outputting circuit 13 and not by the data outputting circuit 23 in Kasai. In addition, Applicants respectfully submit that Kasai clearly distinguishes between PMW data and a PWM signal and it is impermissible that the outstanding Office Action broadly considers these terms as being interchangeable.

Although the outstanding Office Action can interpret the claims broadly, it is believed that the outstanding Office Action can not change the meaning of the terms which are specifically disclosed in the applied art reference.

In addition, regarding the claimed laser modulation signal consisting of a pair of small swing differential signals, the outstanding Office Action asserts in the paragraph bridging pages 4 and 5 that Kasai discloses a first block 200 configured to generate a modulation signal consisting of small swing differential signals. However, it is not clear where Kasai

discloses this feature and Applicants respectfully request that the next Office Action specifically identifies where in Kasai such a disclosure is present.

Accordingly, Applicants respectfully submit that Kasai does not teach or suggest (i) that the PWM data outputting circuit 23 outputs a laser modulation signal, (ii) that the PWM signal outputting circuit 13, which outputs the modulation signal, is formed on the same substrate as the control circuit 21, and (iii) a laser modulation signal consisting of a pair of small swing differential signals.

Thus, Applicants respectfully submit that independent Claims 23 and 30 and each of the claims depending therefrom patentably distinguish over Kasai.

The rejection of Claim 1 is discussed next. Briefly recapitulating, amended Claim 1 more clearly recites a substrate instead of a block and also that a first substrate and a second substrate are distinct and spatially separated from each other. A modulation signal generating unit generates a laser modulation signal consisting of a pair of symmetrical small swing differential signals based on pixel data.

Turning to the applied art, the outstanding Office Action considers that Ema shows in Figure 10 a signal generating unit 112 and a driving unit 107 which are spatially separated. However, Applicants respectfully submit that it appears that unit 112 and unit 107 in Ema are formed on a same substrate and there is no indication in Ema that the two mentioned units are formed on spatially separated and distinct substrates.

In addition, Applicants respectfully submit that Ema does not teach or suggest a laser modulation signal consisting of a pair of symmetrical signals. The outstanding Office Action considers that Ema discloses at column 2, lines 58-63, a pair of small swing differential signals. However, Ema discloses in that paragraph only that a current controls a semiconductor laser 1 and the current is the sum or difference of a current of a negative

feedback loop 3 and a driving current of a current driving unit 4. However, there is no indication in Ema that the two currents are symmetric, as required by independent Claim 1.

Further, the outstanding Office Action asserts that the two currents I_{DA} and I_{DA}^* shown in Figure 11 and the image data shown in Figure 13 of Ema correspond to the claimed pair of small swing differential signals. However, the two currents I_{DA} and I_{DA}^* of Ema are not differential signals because Ema specifically discloses at column 34, second paragraph, that Pulse 1 and Pulse 2 for controlling the two currents (see Figure 11 of Ema) do not operate in a differential manner because both pulses may be in the same phase, i.e., high level or low level.

Regarding Figure 13, although image data is shown in this figure of Ema, the asserted differential signals are not differential signals but 8-bit digital data (bits D0-D7), and the digital data are converted into PWM data as disclosed by Ema at column 35, lines 11-18. Thus, the image data shown in Figure 13 of Ema does not correspond to the claimed differential signals.

Therefore, Applicants respectfully submit that Ema does not teach or suggest (i) a modulation signal generating unit provided on a first substrate and a driving unit provided on a second substrate, spatially separated and distinct from the first substrate, and (ii) a modulation signal consisting of a pair of symmetrical signals.

Hironari shows in Figure 1 a pixel modulation circuit 1 which outputs signals and transmits the signals to a driving circuit 2 via a connection circuit 3. Hironari specifically discloses in the English abstract that "the pixel modulation circuit 1, connection circuit 3 and laser-driving circuit 2 are constituted in **one** semiconductor integrate circuit" (emphasis added). Thus, Hironari does not teach or suggest first and second substrates spatially separated and distinct from each other, as required by Claim 1.

Thompson shows in Figure 7 a laser driver circuit having a switch driver 32 and a bypass switch 30. The outstanding Office Action asserts that the two elements (30 and 32) are two blocks spatially separated from each other. However, Thompson is silent about the switch driver 32 being formed on a first substrate and the bypass switch 30 being formed on a second substrate, and the first and second substrates being spatially separated and distinct from each other, as required by Claim 1.

Accordingly, it is respectfully submitted that amended Claim 1 and each of the claims depending therefrom patentably distinguish over each of Ema, Hironari, and Thompson.

Kaminishi, Trotter, and Canright have been considered but none of these references cures the deficiencies of Ema, Hironari, and Thompson discussed above. Accordingly, it is respectfully submitted that dependent Claims 8, 10, 11, 19, 22, and 29 patentably distinguish over Ema, Hironari, Thompson, Kaminishi, Trotter, and Canright, either alone or in combination.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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